

CLAIMS

What is claimed is:

1. An internal combustion engine having an exhaust system with an air intake duct and an exhaust duct (4), a turbocharger (2) with an exhaust gas turbine (3) disposed in said exhaust gas duct (4) so as to be driven by the exhaust gas of the internal combustion engine and a compressor (5) disposed in the air intake duct (6) and connected to said turbine (3) so as to be driven thereby, a valve (14) disposed in communication with said exhaust duct (4) upstream of said exhaust gas turbine (3), and a bypass line (17) connected to said valve (14) and bypassing said turbine (3) for discharging exhaust gas from the exhaust duct (4) upstream of said turbine (3), said valve (14) including a valve housing with a valve body (21) movably disposed in said valve housing and having first and second different exhaust gas flow control openings (18, 19), said valve body being adjustable between a first position, in which said first gas flow control opening (18) is in communication with said exhaust gas duct (4), a second position in which said second gas flow control opening (19) is in communication with said exhaust gas duct (4) and a blocking position in which exhaust gas flow through said valve (14) is blocked.
2. An internal combustion engine according to claim 1, wherein said first and second gas flow control openings (18, 19) have different cross-sectional areas.

3. An internal combustion engine according to claim 1, wherein said first and second gas flow control openings (18, 19) have different cross-sectional shapes.

4. An internal combustion engine according to claim 1, wherein said valve body (21) is hollow so as to define an open interior space (23), said first and second control openings (18, 19) being formed in the wall of said hollow valve body (21) and said bypass line 17 being in communication with the interior space (23) of said hollow valve body (21).

5. An internal combustion engine according to claim 4, wherein said valve (14) is a rotary slide valve and the valve body (21) is hollow-cylindrical and is mounted such that it can rotate between said first and second open positions and said blocking position.

6. An internal combustion engine according to claim 1, wherein said blocking position is formed by a wall section (22) of said valve body (21) blocking the communication with said exhaust duct (4), said wall section (22) being disposed in the valve body (21) between said first and second openings (18, 29).

7. An internal combustion engine engine according to claim 1, wherein said exhaust gas turbine (3) has two exhaust gas inlet passages (3a, 3b), which are each connected to a different exhaust pipe (4a, 4b) of the exhaust gas duct (4), and each exhaust pipe (4a, 4b) is in communication by a connecting line (15, 16) with a respective release opening (24, 25) in said valve housing for communication selectively with one of the communication openings (18, 19) in the open positions of the valve device (14).

8. An internal combustion engine according to claim 7, wherein the two exhaust gas inlet passages (3a, 3b) have different flow passage cross-sections.

9. An internal combustion engine according to claim 8, wherein an exhaust gas recirculation device (9), is provided having a recirculation line (10), which branches off from one of the exhaust pipes (4a, 4b) assigned to the smaller exhaust gas manifold (3a, 3b) and extends to the intake duct (6) for supplying exhaust gas thereto.

10. An internal combustion engine according to claim 9, wherein the release openings (24, 25) which are assigned to the respective exhaust gas manifolds (3a, 3b) are dimensioned in such a way that the mass flow to be released from both exhaust pipes (4a, 4b) is approximately of the same magnitude.

11. An internal combustion engine according to claim 1, wherein said exhaust gas turbine (3) is equipped with a variable vane structure (13) for controlling the effective inlet flow cross-section of the turbine.

12. A method for operating an internal combustion engine having an exhaust system with an air intake duct and an exhaust duct (4), a turbocharger (2) with an exhaust gas turbin (3) disposed in said exhaust gas duct (4) so as to be driven by the exhaust gas of the internal combustion engine and a compressor (5) disposed in the air intake duct (6) and connected to said turbine (3) so as to be driven thereby, a valve (14) disposed in communication with said exhaust duct (4) upstream of said exhaust gas turbine (3) and a bypass line (17) connected to said valve (14) and bypassing said turbine (3) for discharging exhaust gas from the exhaust

duct (4) upstream of said turbine (3), said valve (14) including a valve housing with a valve body (21) movably disposed in said valve housing and having first and second different exhaust gas flow control openings (18, 19), said valve body being adjustable between a first position, in which said first gas flow control opening (18) is in communication with said exhaust gas duct (4), a second position, in which said second gas flow control opening (19) is in communication with said exhaust gas duct (4) and a blocking position in which exhaust gas flows through said valve (14) is blocked, the valve being moveable to different open positions for the release of exhaust gases in the engine driving mode and for release of exhaust gases in the engine braking mode.